

In the Claims

1. (original) A method of spectroscopically analyzing a material sample, the method comprising:

generating a plasma;

generating a loop current so as to generate a magnetic field, wherein the plasma is confined within the magnetic field;

introducing atoms of the material sample into the plasma wherein excited sample atoms are confined; and

analyzing characteristic features of the excited sample atoms.

2. (original) The method as set forth in Claim 1 wherein generating a loop current comprises generating a sinusoidally alternating electric current.

3. (original) The method as set forth in Claim 2 wherein generating a sinusoidally alternating electric current comprises generating a radio frequency electric current.

4. (original) The method as set forth in Claim 1 wherein analyzing characteristic features of the excited sample atoms comprises analyzing the spectral composition or mass-to-charge ratio of the excited sample atoms.

5. (original) The method as set forth in Claim 1 further comprising electrically grounding the loop current.

6. (original) The method as set forth in Claim 2 wherein generating a loop current comprises generating a planar loop current.
7. (original) The method as set forth in Claim 6 wherein the loop defines an aperture.
8. (original) The method as set forth in Claim 6 wherein generating a loop current comprises generating a plurality of loop currents.
9. (original) The method as set forth in Claim 8 wherein generating a plurality of loop currents comprises generating a plurality of parallel or antiparallel loop currents separated by a prescribed distance.
10. (original) The method as set forth in Claim 9 wherein the alternating electric current in a first loop current flows in a direction opposite to that of the alternating electric current in a second loop current during alternating half cycles of the sinusoidally alternating current.
11. (original) The method as set forth in Claim 7 further comprising adjusting an area of the aperture.

12. (original) The method as set forth in Claim 9 further comprising adjusting the pre-scribed distance.

13. (currently amended) A spectroscopic system comprising:

a loop current having an associated magnetic field, said loop current generated by an electric current source;

a plasma confined within the magnetic field, said plasma generated at least in part by a carrier gas flow introduced within the magnetic field via a carrier gas conduit;

a material sample of excited atoms within the plasma, said material sample introduced into the plasma by via a material sample conduit, and;

a spectrometer for analyzing characteristic features the excited atoms.

14. (original) The spectroscopic system as set forth in Claim 13 further comprising an electric power generator for generating the loop current.

15. (currently amended) The spectroscopic system as set forth in Claim 14 wherein the loop current is a ~~sinusoidally~~ sinusoidally alternating electric current.

16. (currently amended) The spectroscopic system as set forth in Claim 15 wherein the ~~sinusoidally~~ sinusoidally alternating electric current is a radio frequency current.

17. (original) The spectroscopic system as set forth in Claim 13 wherein the loop current is a planar current.

18. (original) The spectroscopic system as set forth in Claim 13 wherein the loop current defines an aperture.

19. (original) The spectroscopic system as set forth in Claim 13 wherein the loop current comprises a plate.

20. (original) The spectroscopic system as set forth in Claim 13 wherein the loop current comprises a plurality of plates.

21. (original) The spectroscopic system as set forth in Claim 17 wherein the plurality of plates are parallel.

22. (new) A spectroscopic system comprising:

an electric current source for generating a loop current, the loop current having an associated magnetic field;

a carrier gas introduced within the magnetic field by a carrier gas conduit, said carrier gas for sustaining a plasma generated within the magnetic field;

an material sample atomized and introduced into the plasma by a material sample conduit, and;

a spectrometer positioned in the vicinity of the plasma for analyzing characteristic features of the excited atoms.